concens

User Manual

C2-20

ver 2,0

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INTRODUCTION

C2-20 is a full H-bridge DC-motor controller. It is designed to work with con35 and con50 electrical in-line actuators in applications where some special functions are needed. It is also possible to use this device with actuators that gives pulses with hall sensors. C2-20 has adjustable acceleration and deceleration ramps, which make the smooth starts and stops possible .

Adjustable current limits in both directions protects motor against overcurrent and it can also be used as an endstop. This device has also two adjustable speeds, whereas the 2nd is used in the learning mode to count the number of hall pulses in a full stroke of the actuator. This enables an accurate positioning of the actuator so it is working as a servo.
Control input is a voltage. The stroke of the actuator is controlled by sending a DC voltage between 0-10,0 Volt to the C2-20. Adjustments and settings: Adjustments and parameter setting like current limit value, ramp times, speed-2 value and all other needed parameters can be set with C2-PROG interface unit, or USB cable with a "dongle" connected to a PC or LAPTOP. This enables the accurate copying of settings and reliable operation of the device in demanding environment. See page 2 for more details.

FEATURES

- Fast change of direction
- Soft start-up, acceleration ramp
- Settable current limit
- Trip or continuous current limit
- High efficiency
- Dynamic braking
- High momentary load capacity
- Rail base fittable
- Freewheel option
- Two control modes

TECHNICAL DATA

Supply voltage	9-35VDC
Actuator current continuous max	15A (Ta<60°C)
Actuator current	max 20A (short time)
Current limit adj.	0.1-20A
Overheat limit	110°C
PWM frequency	2kHz
Hall input freq.	max 1khz
Input control logic:	
"pos" ON=4-30V, OFF=0-1V or open	
Control input impedances typ.	30kohm
Motor and supply connectors:	2.5mm wires max
Control connectors:	1mm wires max
Dimensions	42x72x25mm
Dimensions in DIN-rail base	45x80x45mm
CE-tested for industrial enviroment (EMC)	
Weight	75g
Operating temp (Ta)	0-60°C

WIRING AND SETTINGS FOR C2-20

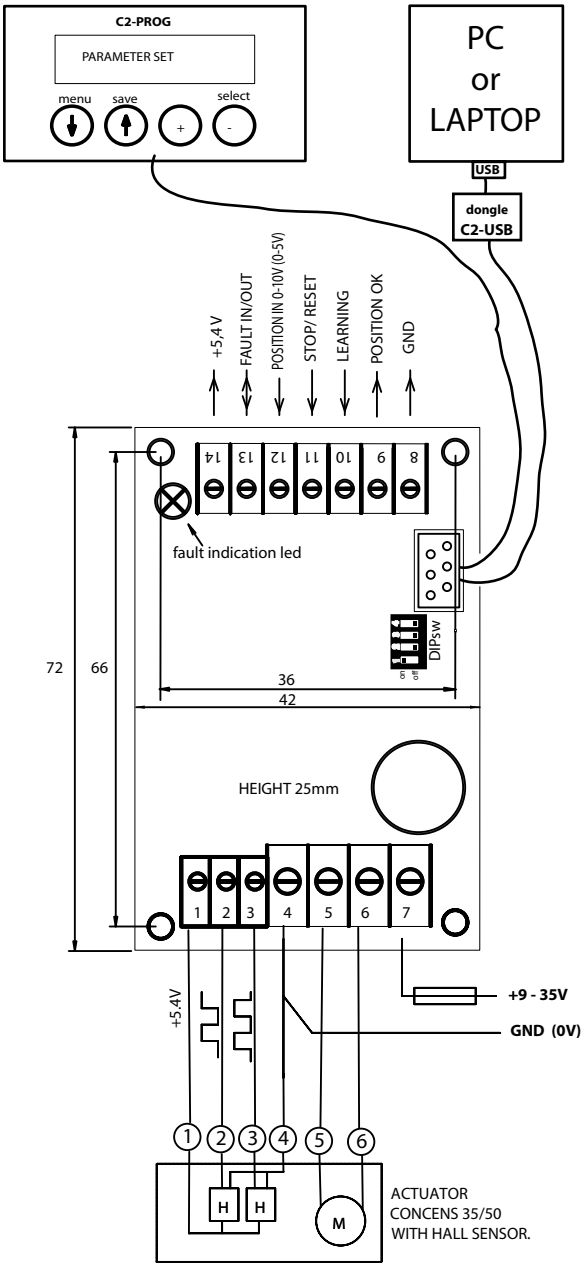
Power supply min-max. 9-35Vdc filtered DC
Recomended ripple lower than 20 %.

First run the learning cycle and then do the
settings with serial interface unit "C2-PROG" or PC or LAPTOP

1/15 **Speed** - 35 - 100% <=> 35-100 (100)
2/15 **Learning speed** - 35 - 100% <=> 35-100 (50)
3/15 **I-limit** "out" 0,1 - 20,0A <=> 1-200 (20)
4/15 **I-limit** "in" 0,1 - 20,0A <=> 1-200 (20)
Notice! current limits are 1.5 times
higher during **start ramp**.
5/15 **I-trip enable** 0/1 <=> off/on (1)
6/15 **I-trip delay** 0 - 255ms <=> 0 - 255 (5)
7/15 **Load compensation** 0 -255 <=> 0 - 255 (0)
8/15 **Pulse lost timeout** 1 - 5s <=> 1 - 5 (2)
9/15 **Start value** 0 - 50% <=> 0 - 50 (30)
10/15 **Hour/Start count** reset 0 - 1, reset when set to 1
11/15 **Brake area** 0,0 - 20,0% <=> 0 - 200 (50)
12/15 **Dead zone** 0,0 - 10,0% <=> 0 - 100 (10)
13/15 **Range scale in** + 0,0 - 50,0% <=> 0 - 500 (7)
14/15 **Range scale out** - 0,0 - 50,0% <=> 0 - 500 (70)
15/15 **Start ramp** 0,1 - 5s <=> 0 - 500 (100)

- **Speed setting** limits the maximum speed.
- **Learning speed** sets the learning cycle speed. (pict. 2)
- **I-limits** are individual for in and out directions
- **I-trip** enables the trip function, so that motor will be shut
down when the set I-lim is exceeded.
- **I-trip** delay defines the reaction time for trip
- **Load** compensation increases the torque at low speed.
Notice that over compensation will cause oscillation
and twiching of the motor.
- **Pulse lost time-out** stops motor after the set time without pulses.
- **Brake area** is proportional value of the full stroke.
In low speed application good value is near 1%, and in high
speed solution it can be near to 20% (pict. 1)
- **Dead zone** is steady area, suitable size of this zone depends
on the mechanical accuracy of the system, this value is also
a ratio of the full stroke (%) (pict 1.)
- **Start value** is a voltage level for start (% of full),
this ensures that the motor gets an adequate voltage
to start properly, but notice that too high start level will
cause motor vibration (pict 1).
- **Range scale** adjustment is for scaling of the stroke, with this can
the scale be adjusted after learning. The in and out ends are
individually scaleable to get the suitable mechanical stroke for
set value from 0-5V (pict. 3)
- **Hour/Start** count reset makes possible to set the hour/start counter to zero
- **Start ramp** limits the acceleration speed when motor starts.

WIRING AND SETTINGS FOR C2-20 ver 2,0



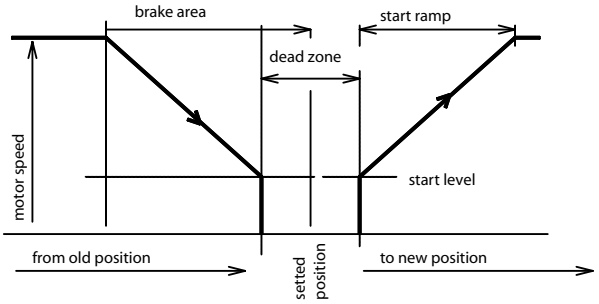
TERMINALS:

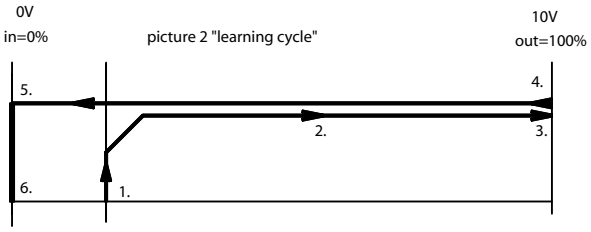
+5,4V - voltage output, max 10mA
FAULT IN/OUT- pnp open collector max 100mA
can be connected to other C2-20 modules, thereby all modules connected will stop if one module sends a FAULT signal. If wirelength is more than 1 meter, a 10kohm pull-up resistor connected to supply is recommended.
POS. SET - analog input 0-10V (0-5V if SW1 on 4 pole SW is OFF), Rin 30k
STOP/RESET - digital in. (>4V and max supplyvoltage) Rin 47k. Stops the motor and resets any fault.
LEARNING - digital in. (>4V and max supplyvoltage) Rin 47k, starts "learning".
POSITION OK - digital out 5 Volt through 1kohm when wanted position is reached, and low during movement.
Note: if "Brake Zone" is very long, then **POSITION OK** signal can be difficult to reach, since the motor only gets very low power to reach within the "dead zone".
GND - signal gnd, same potential as terminal 4.

Cables:	con35 cable		con50 cable	
	Black	Grey	Black	Grey
1 Hall +	red	red	red	red
2 Hall A	yellow	yellow	yellow	yellow
3 Hall B	green	green	green	green
4 Hall GND	orange	blue	blue	blue
5 Actuator -	black	white/grey	blk/pur	white/grey
6 Actuator +	brown	bwn/pur	bwn/or	bwn/pur

LED blinking signals
I-limit occurs = fast blinking
Overtemp = slow blinking
Pulse lost = short, mid, long, short mid long...
Over voltage = burst - pause etc.

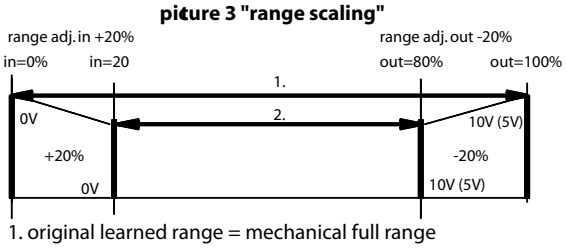
picture 1 "positioning window"





1. start learning by giving an impulse to learn input (10)
2. motor starts to run "out" direction with learn speed
3. current limit stops the motor when mechanical end is reached
4. motor starts to "in" direction and makes a full stroke. During stroke the pulse counter measures the range.
5. motor reaches the mechanical end "in", and current limit stops the motor.
6. Device stores full range value and is ready for use

picture 3 "range scaling"



1. original learned range = mechanical full range equals the signal range 0-10V
2. modified range example:
If range scale in = +20% and
range scale out = -20%.
now stroke of actuator is compressed to:
positioning set value 0V = 20% position
positioning set value 10V (5V) = 80% position

Specifications subject to change without prior notice. It is the responsibility of the product user to determine the suitability of concens as products for a specific application.

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